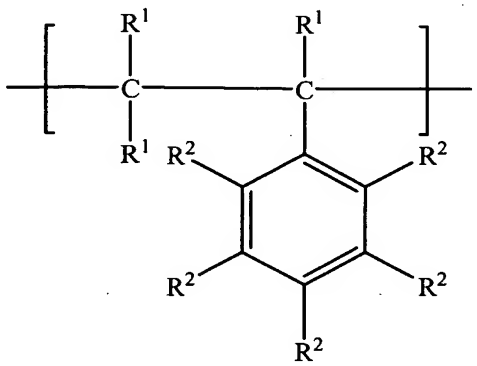
We claim:

1. A microelectronic structure comprising:

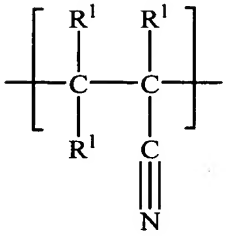
a microelectronic substrate surface; and

a first protective layer adjacent said substrate surface, said first protective layer including a polymer comprising recurring monomers having the respective formulas



(I)

and



(II)

wherein:

each R^1 is individually selected from the group consisting of hydrogen and C_1-C_8 alkyls; and

each R^2 is individually selected from the group consisting of hydrogen, C_1-C_8 alkyls, and C_1-C_8 alkoxys,

said layer being essentially nonconductive.

2. The structure of claim 1, wherein said polymer comprises at least about 50% by weight of monomer I, based upon the total weight of the polymer taken as 100% by weight.

3. The structure of claim 1, wherein said polymer comprises at least about 15% by weight of monomer (II), based upon the total weight of the polymer taken as 100% by weight.

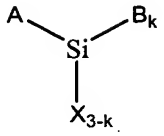
4. The structure of claim 1, said first protective layer having an average thickness of from about 1-5 μm.

5. The structure of claim 1, said structure further comprising a primer layer intermediate said substrate and said first protective layer.

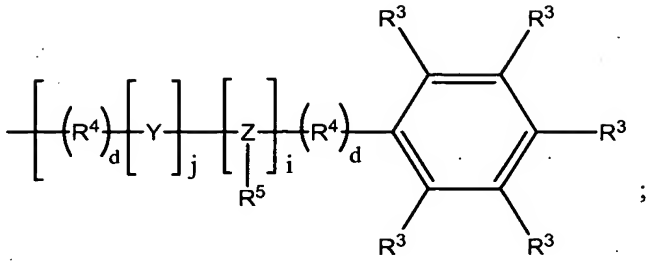
6. The structure of claim 5, said primer layer having an average thickness of less than about 10 nm.

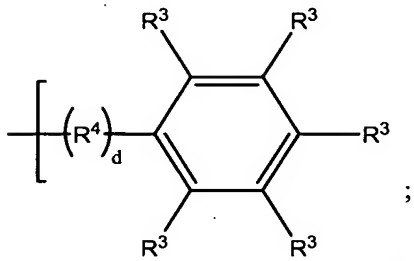
7. The structure of claim 5, said primer layer comprising a silane.

8. The structure of claim 7, said silane having the structure



where:

A =  ;

B =  ;

each of i, j, and k is individually selected from the group consisting of 0 and 1, and if one of i and j is 1, then the other of i and j is 0;

each R^3 is individually selected from the group consisting of hydrogen, the halogens, C_1-C_8 alkyls, C_1-C_8 alkoxys, C_1-C_8 haloalkyls, aminos, and C_1-C_8 alkylaminos;

each R^4 is individually selected from the group consisting of C_1-C_8 aliphatic groups;

each X is individually selected from the group consisting of halogens, hydroxyls, C_1-C_4 alkoxys and C_1-C_4 carboxyls;

Y is selected from the group consisting of oxygen and sulfur;

Z is selected from the group consisting of nitrogen and phosphorus; and

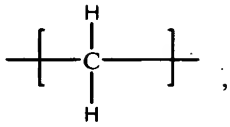
each d is individually selected from the group consisting of 0 and 1.

9. The structure of claim 1, said structure further comprising a second protective layer adjacent said first protective layer.

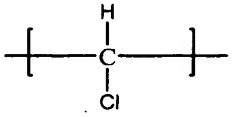
10. The structure of claim 9, said second protective layer comprising a halogenated polymer.

11. The structure of claim 10, said halogenated polymer comprising at least about 50% by weight halogen atoms, based upon the total weight of the halogenated polymer taken as 100% by weight.

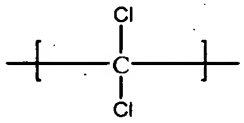
12. The structure of claim 10, wherein said halogenated polymer is a chlorinated polymer comprising recurring monomers having the formula



,



, and



.

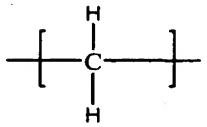
13. The structure of claim 10, wherein said halogenated polymer is a chlorinated polymer selected from the group consisting of poly(vinyl chloride), polyvinylidene chloride, poly(vinylidene dichloride)-co-poly(vinyl chloride), chlorinated ethylene, chlorinated propylene, chlorinated rubbers, and mixtures thereof.

14. The structure of claim 5, said structure further comprising a second protective layer adjacent said first protective layer.

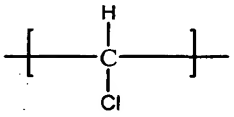
15. The structure of claim 14, said second protective layer comprising a halogenated polymer.

16. The structure of claim 15, said halogenated polymer comprising at least about 50% by weight halogen atoms, based upon the total weight of the halogenated polymer taken as 100% by weight.

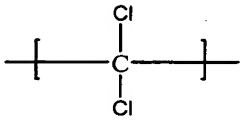
17. The structure of claim 15, wherein said halogenated polymer is a chlorinated polymer comprising recurring monomers having the formula



,



, and

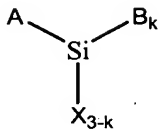


.

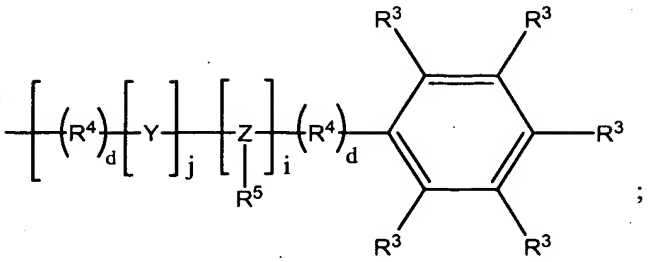
18. The structure of claim 15, wherein said halogenated polymer is a chlorinated polymer selected from the group consisting of poly(vinyl chloride), polyvinylidene chloride, poly(vinylidene dichloride)-co-poly(vinyl chloride), chlorinated ethylene, chlorinated propylene, chlorinated rubbers, and mixtures thereof.

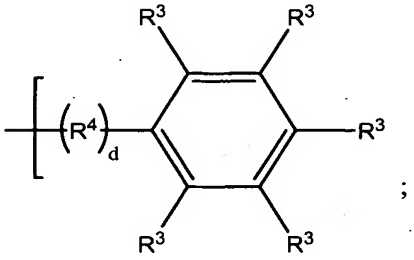
19. The structure of claim 14, said primer layer comprising a silane.

20. The structure of claim 19, said silane comprising the structure



where:

A =  ;

B =  ;

each of i, j, and k is individually selected from the group consisting of 0 and 1, and if one of i and j is 1, then the other of i and j is 0;

each R^3 is individually selected from the group consisting of hydrogen, the halogens, C_1-C_8 alkyls, C_1-C_8 alkoxys, C_1-C_8 haloalkyls, aminos, and C_1-C_8 alkylaminos;

each R^4 is individually selected from the group consisting of C_1-C_8 aliphatic groups;

each X is individually selected from the group consisting of halogens, hydroxyls, C_1-C_4 alkoxys and C_1-C_4 carboxyls;

Y is selected from the group consisting of oxygen and sulfur;

Z is selected from the group consisting of nitrogen and phosphorus; and

each d is individually selected from the group consisting of 0 and 1.

21. The structure of claim 14, wherein said primer layer comprises an aromatic silane, and said second protective layer comprises a halogenated polymer.

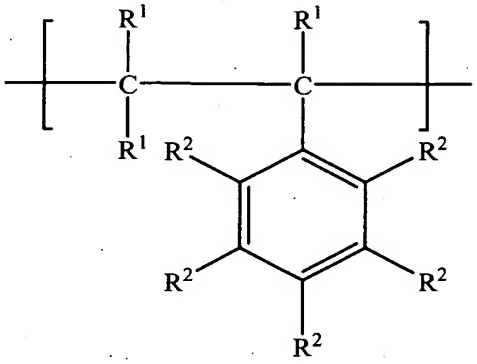
22. The structure of claim 1, wherein said microelectronic substrate is selected from the group consisting of Si substrates, SiO_2 substrates, Si_3N_4 substrates, SiO_2 on silicon substrates, Si_3N_4 on silicon substrates, glass substrates, quartz substrates, ceramic substrates, semiconductor substrates, and metal substrates.

23. A microelectronic structure comprising:

a microelectronic substrate having a surface;

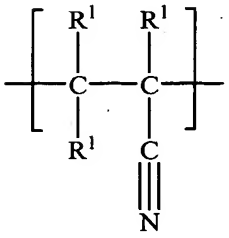
a primer layer adjacent said substrate surface; and

a first protective layer adjacent said primer layer, said first protective layer including a polymer comprising recurring monomers having the respective formulas



(I)

and



(II)

,

wherein:

each R^1 is individually selected from the group consisting of hydrogen and C_1-C_8 alkyls; and

each R^2 is individually selected from the group consisting of hydrogen, C_1-C_8 alkyls, and C_1-C_8 alkoxys.

24. The structure of claim 23, wherein said polymer comprises at least about 50% by weight of monomer I, based upon the total weight of the polymer taken as 100% by weight.

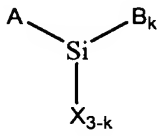
25. The structure of claim 23, wherein said polymer comprises at least about 15% by weight of monomer (II), based upon the total weight of the polymer taken as 100% by weight.

26. The structure of claim 23, said first protective layer having an average thickness of from about 1-5 μm.

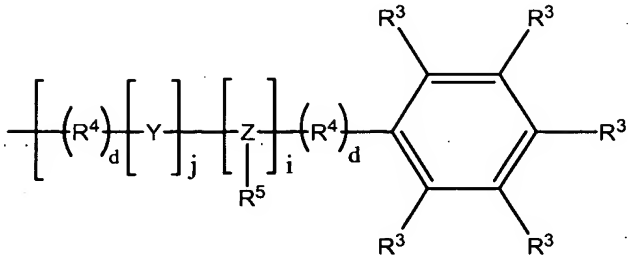
27. The structure of claim 23, said primer layer comprising a silane.

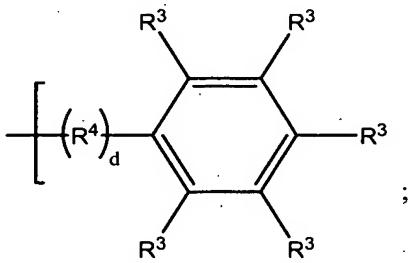
28. The structure of claim 23, said primer layer having an average thickness of less than about 10 nm.

29. The structure of claim 27, said silane having the structure



where:

A =  ;

B =  ;

each of i, j, and k is individually selected from the group consisting of 0 and 1, and if one of i and j is 1, then the other of i and j is 0;

each R^3 is individually selected from the group consisting of hydrogen, the halogens, C_1-C_8 alkyls, C_1-C_8 alkoxys, C_1-C_8 haloalkyls, aminos, and C_1-C_8 alkylaminos;

each R^4 is individually selected from the group consisting of C_1-C_8 aliphatic groups;

each X is individually selected from the group consisting of halogens, hydroxyls, C_1-C_4 alkoxys and C_1-C_4 carboxyls;

Y is selected from the group consisting of oxygen and sulfur;

Z is selected from the group consisting of nitrogen and phosphorus; and

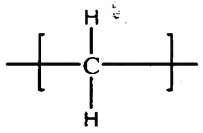
each d is individually selected from the group consisting of 0 and 1.

30. The structure of claim 23, said structure further comprising a second protective layer adjacent said first protective layer.

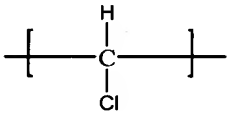
31. The structure of claim 30, said second protective layer comprising a halogenated polymer.

32. The structure of claim 31, said halogenated polymer comprising at least about 50% by weight halogen atoms, based upon the total weight of the halogenated polymer taken as 100% by weight.

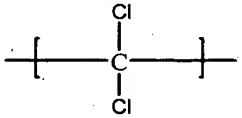
33. The structure of claim 31, wherein said halogenated polymer is a chlorinated polymer comprising recurring monomers having the formula



,



, and



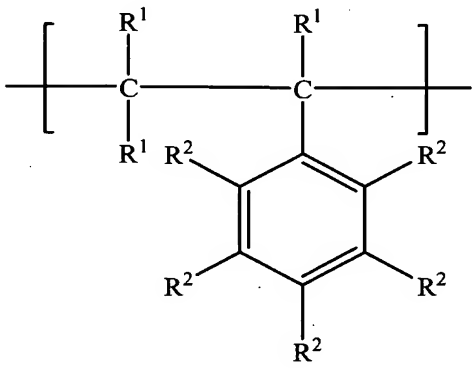
.

34. The structure of claim 31, wherein said halogenated polymer is a chlorinated polymer selected from the group consisting of poly(vinyl chloride), polyvinylidene chloride, poly(vinylidene dichloride)-co-poly(vinyl chloride), chlorinated ethylene, chlorinated propylene, chlorinated rubbers, and mixtures thereof.

35. The structure of claim 23, wherein said microelectronic substrate is selected from the group consisting of Si substrates, SiO_2 substrates, Si_3N_4 substrates, SiO_2 on silicon substrates, Si_3N_4 on silicon substrates, glass substrates, quartz substrates, ceramic substrates, semiconductor substrates, and metal substrates.

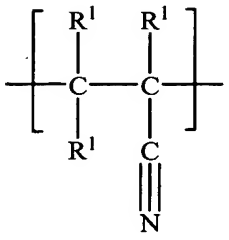
36. The structure of claim 30, wherein said microelectronic substrate is selected from the group consisting of Si substrates, SiO_2 substrates, Si_3N_4 substrates, SiO_2 on silicon substrates, Si_3N_4 on silicon substrates, glass substrates, quartz substrates, ceramic substrates, semiconductor substrates, and metal substrates.

37. A method of forming a microelectronic structure, said method comprising the step of applying a first protective layer to a microelectronic substrate surface, said first protective layer including a polymer comprising recurring monomers having the respective formulas



(I)

and



(II)

wherein:

each R^1 is individually selected from the group consisting of hydrogen and C_1-C_8 alkyls; and

each R^2 is individually selected from the group consisting of hydrogen, C_1-C_8 alkyls, and C_1-C_8 alkoxys,

said first protective layer being essentially nonconductive.

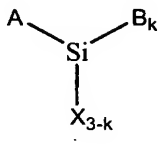
38. The method of claim 37, wherein said polymer comprises at least about 50% by weight of monomer I, based upon the total weight of the polymer taken as 100% by weight.

39. The method of claim 37, wherein said polymer comprises at least about 15% by weight of monomer (II), based upon the total weight of the polymer taken as 100% by weight.

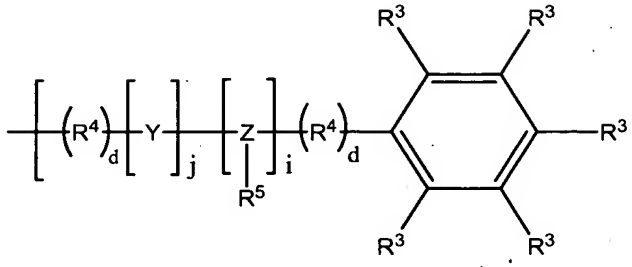
40. The method of claim 37, further comprising the step of applying a primer layer to said substrate surface prior to said first protective layer applying step.

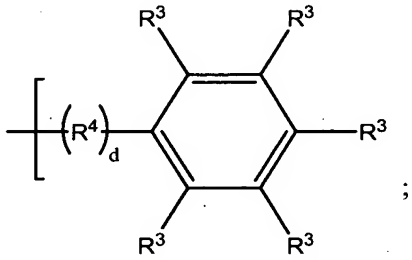
41. The method of claim 40, said primer layer comprising an aromatic silane.

42. The method of claim 41, said aromatic silane having the structure



where:

A =  ;

B =  ;

each of i, j, and k is individually selected from the group consisting of 0 and 1, and if one of i and j is 1, then the other of i and j is 0;

each R^3 is individually selected from the group consisting of hydrogen, the halogens, C_1-C_8 alkyls, C_1-C_8 alkoxys, C_1-C_8 haloalkyls, aminos, and C_1-C_8 alkylaminos;

each R^4 is individually selected from the group consisting of C_1-C_8 aliphatic groups;

each X is individually selected from the group consisting of halogens, hydroxyls, C_1-C_4 alkoxys and C_1-C_4 carboxyls;

Y is selected from the group consisting of oxygen and sulfur;

Z is selected from the group consisting of nitrogen and phosphorus; and

each d is individually selected from the group consisting of 0 and 1.

43. The method of claim 41, wherein said substrate surface comprises a plurality of surface hydroxyl groups, said method further comprising the step of heating said primer layer so that said aromatic silane from said primer layer bonds with at least some of said surface hydroxyl groups.

44. The method of claim 40, further comprising the step of heating said first protective layer so that it bonds with said primer layer.

45. The method of claim 37, further comprising the step of applying a second protective layer to said first protective layer.

46. The method of claim 45, said second protective layer comprising a halogenated polymer.

47. The method of claim 46, said halogenated polymer comprising at least about 50% by weight halogen atoms, based upon the total weight of the halogenated polymer taken as 100% by weight.

48. The method of claim 46, wherein said halogenated polymer is a chlorinated polymer.

49. The method of claim 40, further comprising the step of applying a second protective layer to said first protective layer.

50. The method of claim 49, said second protective layer comprising a halogenated polymer and said primer layer comprising an aromatic silane.

51. The method of claim 37, wherein said microelectronic substrate surface is on a substrate selected from the group consisting of Si substrates, SiO_2 substrates, Si_3N_4 substrates, SiO_2 on silicon substrates, Si_3N_4 on silicon substrates, glass substrates, quartz substrates, ceramic substrates, semiconductor substrates, and metal substrates.

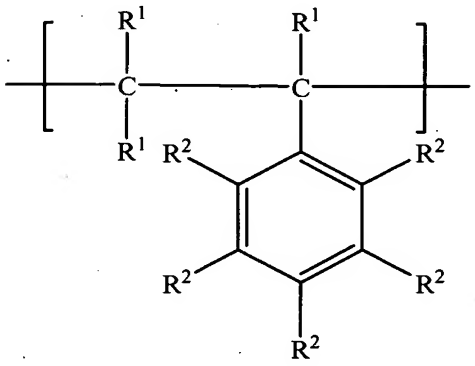
52. The method of claim 44, wherein said heating step yields a primer/first protective layer combination which exhibits less than about 3 mm of lifting when subjected for about 2 hours to etching in an approximately 30-35% by weight aqueous KOH solution having a temperature of about 83-87°C.

53. The method of claim 44, wherein said heating step yields a primer/first protective layer combination having less than about 0.1 pinholes per cm^2 of substrate surface.

54. A method of forming a microelectronic structure, said method comprising the steps of:

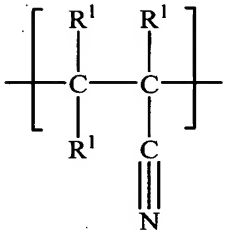
applying a primer layer to a microelectronic substrate surface; and

applying a first protective layer to said primer layer, said first protective layer including a polymer comprising recurring monomers having the respective formulas



(I)

and



(II)

,

wherein:

each R^1 is individually selected from the group consisting of hydrogen and C_1-C_8 alkyls; and

each R^2 is individually selected from the group consisting of hydrogen, C_1-C_8 alkyls, and C_1-C_8 alkoxys.

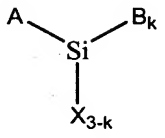
55. The method of claim 54, wherein said polymer comprises at least about 50% by weight of monomer I, based upon the total weight of the polymer taken as 100% by weight.

56. The method of claim 54, wherein said polymer comprises at least about 15% by weight of monomer (II), based upon the total weight of the polymer taken as 100% by weight.

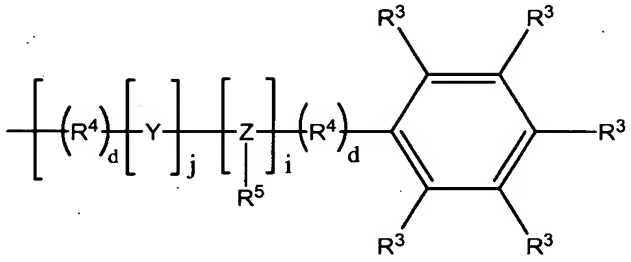
57. The method of claim 54, wherein said polymer comprises from about 50-85% by weight of monomer (I) and from about 15-40% by weight of monomer (II), said percentages by weight being based upon the total weight of the polymer taken as 100% by weight.

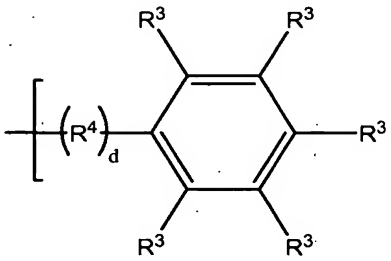
58. The method of claim 67, said primer layer comprising an aromatic silane.

59. The method of claim 58, said aromatic silane having the structure



where:

A =  ;

B =  ;

each of i, j, and k is individually selected from the group consisting of 0 and 1, and if one of i and j is 1, then the other of i and j is 0;

each R^3 is individually selected from the group consisting of hydrogen, the halogens, C_1-C_8 alkyls, C_1-C_8 alkoxys, C_1-C_8 haloalkyls, aminos, and C_1-C_8 alkylaminos;

each R^4 is individually selected from the group consisting of C_1-C_8 aliphatic groups;

each X is individually selected from the group consisting of halogens, hydroxyls, C_1-C_4 alkoxys and C_1-C_4 carboxyls;

Y is selected from the group consisting of oxygen and sulfur;

Z is selected from the group consisting of nitrogen and phosphorus; and

each d is individually selected from the group consisting of 0 and 1.

60. The method of claim 54, wherein said substrate surface comprises a plurality of surface hydroxyl groups, said method further comprising the step of heating said primer layer so that said aromatic silane from said primer layer bonds with at least some of said surface hydroxyl groups.

61. The method of claim 54, further comprising the step of heating said first protective layer so that it bonds with said primer layer.

62. The method of claim 54, further comprising the step of applying a second protective layer to said first protective layer.

63. The method of claim 62, said second protective layer comprising a halogenated polymer.

64. The method of claim 63, said halogenated polymer comprising at least about 50% by weight halogen atoms, based upon the total weight of the halogenated polymer taken as 100% by weight.

65. The method of claim 64, wherein said halogenated polymer is a chlorinated polymer.

66. The method of claim 54, wherein said microelectronic substrate surface is on a substrate selected from the group consisting of Si substrates, SiO_2 substrates, Si_3N_4 substrates, SiO_2 on silicon substrates, Si_3N_4 on silicon substrates, glass substrates, quartz substrates, ceramic substrates, semiconductor substrates, and metal substrates.

67. The method of claim 61, wherein said heating step yields a primer/first protective layer combination which exhibits less than about 3 mm of lifting when subjected for about 2 hours to etching in an approximately 30-35% by weight aqueous KOH solution having a temperature of about 83-87°C.

68. The method of claim 61, wherein said heating step yields a primer/first protective layer combination having less than about 0.1 pinholes per cm^2 of substrate.

69. A microelectronic structure comprising:

a microelectronic substrate having a surface;

a primer layer adjacent said substrate surface;

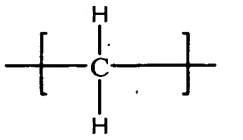
a first protective layer adjacent said primer layer, said first protective layer comprising a polymer dispersed or dissolved in a solvent system; and

a second protective layer adjacent said first protective layer, said second protective layer comprising a halogenated polymer dispersed or dissolved in a solvent system.

70. The structure of claim 69, wherein said halogenated polymer comprises a chlorinated polymer.

71. The structure of claim 70, wherein said chlorinated polymer comprises at least about 50% by weight chlorine atoms, based upon the total weight of the chlorinated polymer taken as 100% by weight.

72. The structure of claim 70, wherein said halogenated polymer is a chlorinated polymer comprising recurring monomers having the formula



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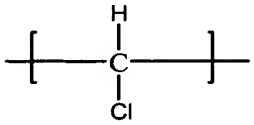

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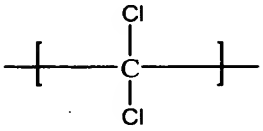

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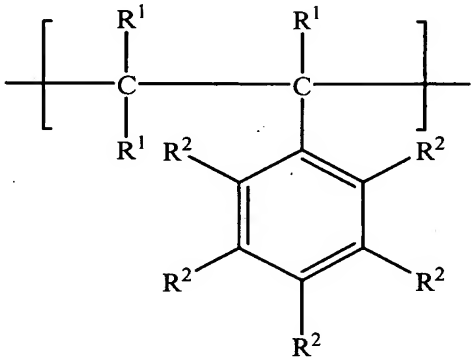
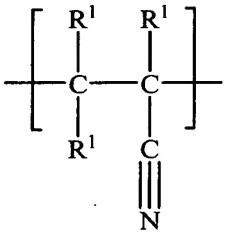
73. The structure of claim 70, wherein said halogenated polymer is selected from the group consisting of poly(vinyl chloride), polyvinylidene chloride, poly(vinylidene dichloride)-co-poly(vinyl chloride), chlorinated ethylene, chlorinated propylene, chlorinated rubbers, and mixtures thereof.

74. The structure of claim 69, wherein said first protective layer comprises a polymer comprising recurring monomers having the respective formulas



(I)

and



(II)

wherein:

each R^1 is individually selected from the group consisting of hydrogen and C_1-C_8 alkyls; and

each R^2 is individually selected from the group consisting of hydrogen, C_1-C_8 alkyls, and C_1-C_8 alkoxys.

75. A method of forming a microelectronic structure, said method comprising the steps of:

applying a primer layer to a microelectronic substrate surface;

applying a first protective layer to said primer layer, said first protective layer comprising a polymer dispersed or dissolved in a solvent system; and

applying a second protective layer to said first protective layer, said second protective layer comprising a halogenated polymer dispersed or dissolved in a solvent system.

76. The method of claim 75, wherein said halogenated polymer comprises a chlorinated polymer.

77. The method of claim 76, wherein said chlorinated polymer comprises at least about 50% by weight chlorine atoms, based upon the total weight of the chlorinated polymer taken as 100% by weight.